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THE CABLE CARS  
OF SAN FRANCISCO



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# HISTORY OF THE HILL CLIMBERS

The cable car has often been referred to as the very embodiment of the days following the Gold Rush when San Francisco lived high, wide and handsome, when the city's prominent families such as the Crockers and the Floods and the Mackays were importing rare wines, crystal, and the finest works of European art for their lavish homes on Nob Hill, and Emperor Norton was holding court in the Montgomery Street bars, grandly ordering the city fathers



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Municipal Railway.  
Cable Cars of San Francisco

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## HISTORY OF THE HILL CLIMBERS

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The city has always opened its heart to a man with an idea no matter how wild it seemed.

Such a man was Andrew S. Hallidie, born in London of Scottish parents, in 1836, and brought to California when his father came here to look after land interests.

Actually his name was Andrew Smith. He adopted his surname Hallidie from his godfather, Sir Andrew Hallidie, physician to King William IV and Queen Victoria.

His father, Andrew Smith, was an inventor and engineer who in 1835 had patented a process to make wire rope.

By 1869 their initial beginning of wire rope manufacture culminated in the A. S. Hallidie and Company which was located at Mason and Chestnut Streets in San Francisco.

It was during this year, while walking up one of the city's steep hills on a foggy winter night, that Andrew Hallidie came upon a heavily laden horsecar, the only public transportation of the time, also struggling up the slope.

DOCUMENTS

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*San Francisco,  
Municipal Railway,  
Cable Cars of San Francisco*

One of the horses stumbled and fell, the brake slipped and the car rolled back down the hill, dragging the four frantic beasts behind.

From then on, Hallidie became a man with a mission dedicated to saving the lives of thousands of horses that every year were being destroyed dragging trams throughout the cities of the world.

He had already perfected cables that could withstand the tremendous strain put upon them. They had already been in service with a number of industrial corporations, most spectacular of which were several aerial tramways for the transporting of gold- and silver-bearing ore down from mines located at almost inaccessible heights in the Sierras.

Now he set to work to develop a cable grip that would carry a load of passengers up the steep San Francisco hills while the city laughed and called it "Hallidie's Folly."

In 1872, Hallidie and three of his friends, Henry Davis, a one-time San Francisco sheriff; James Moffett and Joseph Britton, a well established lithographer, became actively interested. A corporation was formed, a franchise was obtained to construct a railway up the Clay Street hill from Kearny and the books were opened for stock subscription.



*The grand-daddy of all San Francisco cable cars, the Clay Street R. R. Company with Andrew Hallidie at the "wheel"*



The temporary office in the Clay Street bank, where a working model of the proposed tramway was on exhibit, wrote up few subscriptions.

Hallidie himself put up \$20,000. His three partners contributed an additional \$40,000 while the bank itself advanced \$30,000 against a mortgage on the entire project. The slot, the first of its kind in the world, was completed a scant two days before the first experimental run was scheduled.

A powerhouse for the experimental railroad had been erected at the corner of Clay and Leavenworth Streets. Here, the night before the trial run, fires were lit beneath the huge iron boilers and engineers occasionally let a few pounds of steam into the ponderous engines which revolved the cable drums.

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The cable cars of San  
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The morning of August 1, 1873, was cool and damp. Fog rolled in from the ocean beyond Point Lobos in swirling cloudbanks. The rails were damp and everyone feared for the brakes.

Only a handful of people climbed out of their beds to watch a small group of men anxiously tinkering with the brightly painted wooden trolley standing at the top of Clay Street.

No crowds cheered nor bells rang as the first cable car in history made its maiden run that day.

Nothing demonstrated the Scotsman's complete confidence in his own design better than the fact that he chose to make the initial run from the top down. An ordinary man would have started at the bottom of the hill. Then if things did go wrong he wouldn't be streaking down six blocks of near precipice to land in a heap of splintered wreckage.

Some such thoughts must have passed through the first gripman's mind as he boarded the little car poised on the crest.

According to reports of the time he took one long look down the steep, fog-shrouded hill, turned pale and disappeared.

Hallidie stepped forward, waved a cheery farewell to the small crowd, took hold of the grip wheel himself—the original grip was tightened by a screw—and began to turn it. The car slowly “took rope” and rolled smoothly over the brink and down the 20% grade at an even nine miles per hour.



*There was still land available in 1914 when these two United Railroad Powell line cars met midway between Bush and Pine Streets*

Thus was set in operation the first cable line in the United States, the Clay Street Hill Railroad.

(A part-street, part-cable line, the London and Blackwall Passenger Railway, operating in London, apparently pre-dates Hallidie's Clay Street Hill Railroad by 37 years, however.)

San Francisco quickly took the cable cars to its ample heart. Eager speculators were granted franchises indiscriminately. The city was on a cable car binge. While patent fights raged in the courts such legendary business leaders as Leland Stanford and Mark Hopkins were forming their own cable railways.

By 1890 the city's population of approximately 299,000 was served by eight cable car companies operating 600 cars over 110 miles of single cable track and employing 1,500 men.

In addition, there were still some 25 miles of horsecar lines as well as two steam lines, on either side of Golden Gate Park, which carried passengers to the Beach.

Here are the eight, competing companies and dates of their initial operation. The car lines up Telegraph Hill and the Fillmore Hill were not true cable lines in the sense that they operated as "counter-balances," the descending car lifted the ascending car by its weight.

|                                      |      |
|--------------------------------------|------|
| Clay Street Hill Railroad            | 1873 |
| Sutter Street Railroad               | 1876 |
| California Street Cable Railroad     | 1878 |
| Geary Street Park and Ocean Railroad | 1880 |
| Presidio and Ferries Railroad        | 1880 |
| Market Street Cable Railway Company  | 1883 |
| Ferries and Cliff House Railroad     | 1887 |
| Omnibus Cable Car Company            | 1889 |

Other non-cable companies in operation at this time were:

City Railroad Company (Horse)

North Beach and Mission Railroad Company (Horse)

Park and Ocean Railroad (Steam)

Between 1891 and 1894 all of the companies mentioned above were consolidated into the Market Street Railway Company except the

California Street Railroad

Presidio and Ferries Railroad

Sutter Street Railroad

Geary Street, Park and Ocean Railroad

Like the horsecar, the cable car played a vital part in the city's growth. Reversing the population trend to the south of Market area, the cable car led to the building of homes in the northeast area of the city and in the valleys beyond.

There was also a warm affinity between the city's 35,000 Chinese and the crews of the cable lines which bisected the lantern-festooned streets of one of the most colorful areas of San Francisco — Chinatown.

In the old days, stalwart gripmen and conductors, usually Irish, would befriend newly arrived Chinese by beating off thugs who wanted to rob them. In gratitude, the Chinese pressed gifts of rice cakes, fortune cookies, tea and carved ivory trinkets onto the helpful cablemen.



*The umbrella-shaped "Balloon Car" of the Sutter Street Railway was invented in the 1870's by Henry Casebolt. The car was equipped with a patented device which allowed the body to be rotated on its truck so that no turntable was needed*



*A 1905 Sutter Street dummy car at the Powell-Sutter Street intersection*



During the not too infrequent tong wars which kept even dogs and cats off the streets of an ominously quiet Chinatown, the dinkies clattered serenely through the battlefield indifferent to rocks or the whine of stray bullets which occasionally shattered a car window.

The variety of equipment used by the horsecar companies was matched and surpassed by the different types of cars designed and used by the cable car operators.

In the belief that the steep grades would make long or heavy cars impractical, the early cable lines, such as the Clay Street Hill Railroad and the Sutter Street Railroad, employed trailers or passenger cars hauled by "dummy" cars carrying the grip and brakes.

Originally the dummies were for the gripman only, but later seats were added for passenger use on the sides and front leaving the central space for the gripman and his array of wheels, levers, cranks and pedals.

Trailers had a seating capacity of 18 and dummies 16 and were extremely popular with fresh air loving San Franciscans.

In order to eliminate the cumbersome turntables at terminals, the California Street Railroad developed its six-ton, 34-passenger double-enders. These were provided with open air seats both in front and rear with a closed section in the middle.

This "California" type car proved both a popular and economical vehicle and it subsequently served as a model for the first electric cars and influenced the design of the later Municipal and United Railroads' equipment.

The increasing number of accidents and near-misses at intersections involving cable cars, pedestrians, wagons, carriages, horses, etc., caused the San Francisco Board of Supervisors, in 1882, to require all cable cars to carry bells or gongs.

Their order further stated that "it shall be unlawful for the driver of any streetcar, grip car or dummy to approach any street crossing within a distance of 25 feet without ringing a bell or sounding a gong which bell or gong must be rung or sounded until said streetcar, grip car or dummy shall have passed over said streetcar crossing."



*The old Sutter Street line was in operation as late as the 1906 fire. Enjoying the fresh air are passengers whizzing past what is now the 450 Sutter building*

And so today the cable car bells are still being rung in the smart shopping districts around Union Square, the magnificent hotels atop Nob Hill and down the roller coaster incline of Hyde Street, a unique and truly San Francisco sound loved and enjoyed by native and visitor alike.

And Andrew Hallidie, the father of the cable car, deservedly took his place among San Francisco's honored citizens and devoted much of his semi-retired years to the general welfare of the community. He gained recognition and prominence through his participation on the speaker's platform and in the press in the discussion of important issues of the day. His brilliant articles on labor organization and kindred subjects attracted wide attention.

He served as chairman of the Finance Committee of the University of California and associated himself with the Mechanics Institute Library.

In 1878 he was elected as a member of the Board of Freeholders to form and prepare a Charter for the City and County of San Francisco and was re-elected to this body in 1886.

Mr. Hallidie died in San Francisco on April 24, 1900.

## HONG KONG AND NEW ZEALAND — SAN FRANCISCO'S ONLY COMPETITION

As far as we know, San Francisco's only cable car competition, at least in this half of the world, is in Wellington, New Zealand and Hong Kong.

Both cities have funicular cable systems although a true cable car aficionado properly points out that these are a "counter-balance" type of operation in which the ascending car is pulled up by the weight of the descending car, plus auxiliary motor power.

In Hong Kong, two 72-passenger cars operate from Garden Road, in the City of Victoria, to the Peak, on a ten-minute journey, 1,300 feet above sea level, at a grade of one-in-two (a one-foot rise in a two-foot distance)

The system is officially known as Peak Tramways Ltd., carries over two million passengers per year, operates on two miles of cable and has been in business since 1888 although the present haulage system was substantially revamped in 1925.

This year, Wellington's unique "Kelburn" cable car system celebrates its 66th birthday. One of the most popular of New Zealand's tourist attractions, the line was built in the late 1800's by gangs of men — some, prisoners from the old Terrace Gaol — using picks, spades, shovels and wheelbarrows.

Tunnels were hacked through ridges, viaducts were built over gullies and track was finally laid, on a one-in-five grade, connecting Lambton Quay to Kelburn, 500 feet above the city's busy heart.

This very scenic trip takes about four minutes and over four million passengers a year are carried on the two open-air cars.



Up until a few years ago the Wellington system was overshadowed by its neighboring coastal city of Dunedin on the Southern island, which had three cable car routes wending their way up a steep hill in the center of the city.

But Dunedin, in an excess of civic budget consciousness and modernity, decided that the funicular system should be replaced by trolley buses even though the cable cars carried thousands of delighted passengers each year.

And so, on the second of March, 1957, Car No. 101 gripped the rope for the last time and cable traction in Dunedin became history.

Another car, No. 105, was donated to the New Zealand Electric Railway Historical Society trolley museum where it can be seen today.



*The Kelburn cable car ascending from  
Lambton Quay, Wellington, New Zealand*

## A SIX-TON, MOVING NATIONAL LANDMARK

You've probably never heard of a six-ton, moving National Historic Landmark but we've got one here in San Francisco.

That's right, the cable car.

As a matter of fact, the entire cable car system — cars, tracks, turntables and car barn. It was so designated by the National Park Service, United States Department of the Interior, October 1, 1964, in appropriate and colorful ceremonies at Victorian Park near the Hyde Street cable car turntable.

Chief Justice of the United States Earl Warren participated in the official presentation to the City of San Francisco of a two by three foot bronze plaque noting that the cable cars were now a "Registered National Historic Landmark." Mr. John H. Carver, Jr., Under Secretary, represented the Department of the Interior in the presentation.

The metal tablet can be seen today near the Hyde Street turntable surrounded by flowers and imbedded solidly in a base of old cobblestones formerly used as track bed in the early days of San Francisco cable operation. A duplicate plaque is also affixed to the brick wall of the Cable Car Barn visitors gallery.

Interestingly enough, nearby is another "National Historic Landmark" neighbor, the 450-ton, last-surviving lumber sailing schooner "C. A. Thayer" built by Bendixsen of Eureka, in 1895, and now housed at the San Francisco Maritime State Historical Park, State of California Division of Beaches and Parks. The Maritime Park is located one block north from the Hyde Street turntable.

The "C. A. Thayer" joined the elite and venerable National Park Historic Landmark group in November, 1966.



## THE "BARN" HOME OF THE CABLE CARS

Although at one time it was officially known as the Washington-Mason Car and Power House, the home of the cable cars is now called Washington-Mason Division or simply, "The Barn."

Constructed in 1886 as a three-story brick building, the carhouse, and most of the cars and equipment, were almost completely destroyed during the 1906 earthquake and fire.

It was re-built the following year and the tall chimney at the southwest corner of the building carrying smoke from the original steam boiler room can still be seen today.

A vigorous program of "reverse modernization" and refurbishment is presently under way to restore to the structure some of the old brick and gaslight atmosphere of early San Francisco. In this vein the Barn has been undergoing extensive rehabilitation, both interior and exterior.

The entire exterior has been sandblasted down to its original red brick and the windows, doors and trim have been painted in the original, harmonizing colors.



Dedication of a spacious new Visitors' Gallery took place on November 10, 1967 when the Honorable Alan S. Boyd, Secretary of Transportation, said he came to San Francisco "—to lead cheers for the cable car, surely one of the most engaging examples ever of the irrepressible inventiveness of man."

Plans are also under way for an addition to the Gallery, the construction of exhibit rooms, souvenir shop, photo displays and special flood lighting for motion picture and still photography.

Although visitors are permitted to walk through the car barn—except for the ground floor powerhouse—certain portions of the Gallery, display and exhibit rooms are still under construction.

Groups of 25 or over should contact the Division Superintendent, 558-3383, beforehand, to arrange for time and accommodations.

The Visitors' Gallery is open every day from 8:00 a.m. to 12 Midnight.



## WINDSHIELD WIPERS — A CONCESSION TO PROGRESS

It seems hard to believe but the cable cars were “modernized” last year by the installation of electrically operated windshield wipers — the first improvement of this type to take place in 100 years!

Actually, it has only been recently, through the purchase of more powerful storage batteries, that brighter headlights and other electrical equipment such as the wipers, have been possible. The cable cars, of course, are not connected with any electrical source such as the overhead power lines used by the streetcars and trolley coaches.

In place of the old “lead-acid” storage batteries, which barely supported fore and aft headlights and which had to be recharged each night, the Railway purchased forty \$300 apiece Nickel Iron Alkaline batteries which can operate at full capacity for 16 hours and are four times more powerful than the old conventional type.

Cable car gripmen are enthusiastic about their new view from the “grip-hole” in the front of the car, especially during rainy weather. Several elderly, daily cable car riders, however, have denounced the new addition as the work of the Devil and, as one stated, he holds the opinion that “If cable cars had needed windshield wipers the good Lord would have built them that way.”

It should be observed that San Franciscans are slow to change where tradition and sentiment are involved and are fiercely protective about their antique mode of transportation.





## NOB HILL'S 80-YEAR-OLD LANDMARK

One of the most familiar landmarks on Nob Hill is the quaint, gold and maroon gazebo on the southeast corner of Powell and California Streets.

This little signal house has been in almost continuous operation since 1887 when some sort of intersection control was needed to prevent the newly-built Powell line cable cars from arriving at the top of the hill at the same time as the California line cars.

The signal house still serves the same purpose today and a towerman is always on duty when the cable lines are in operation.

By means of hand-operated red and green stop and go signals the towerman controls the cable car traffic at the Powell-California intersection as the lights can be seen by gripmen on both lines at least a block away.





## THE ALL-IMPORTANT "ROPE"

The cable, or "rope" as it is often referred to by the cable crew, never breaks from simply wearing out. It is carefully watched at all times and when worn is spliced at night after the lines are shut down at 1:00 in the morning.

The cable car can be damaged, however, necessitating emergency repairs usually consisting of a splice, or patch.

"Broken strands" have been bad news around cable car operation since the days of Hallidie. These are simply wires that somehow break loose from the thick woven strand and project out at an angle guaranteed to cause trouble.

Fortunately, an ingenious alarm system consisting of a U-shaped fork device in close tolerance to the moving cable, and a locator board at the carhouse, alerts the cable maintenance crew to the possibility of a broken strand.



In addition to the four strand alarms in the basement tunnels of the Cable Car Barn, one for each cable, there are seven additional cable guards located underneath the streets at the intersections of Powell-Market, Powell-California, California-Hyde, California-Drumm, Bay-Taylor, Beach-Hyde and Geary-Powell. Plans call for an eighth alarm at Jackson and Mason Streets and the use of electronic warning devices is being studied.

Any foreign object or projection on the cable, passing through the strand alarm, triggers a warning bell at the carhouse locator board. All cable machinery is immediately shut down and the broken strand located by the maintenance crew who are able to peer into the cable slot or to raise the pulley covers which are built into the street every twenty or thirty feet.

A temporary splice is made in the street and the repair crew alerts the Cable Machinery Foreman at the carhouse, through radio communication, to slowly start the 700 hp, Fairbanks-Morse, three-phase wound rotor induction motor and pull the cable into the carhouse.

A second 750 hp, General Electric motor is also alternated with the Fairbanks-Morse, however only one is used at one time.

When the damaged section reaches the carhouse several gentlemen with rather impressive titles of Wire Rope Cable Maintenance Mechanics sprint into action and carefully weave together a permanent section which is generally 55 feet long. For some reason it has been found that this length is the most practical from the standpoint of wire strength and serviceability.

This giant repair job, which usually takes about three or four hours, is a precise operation in that the spliced portion must be exactly the same diameter,  $1\frac{1}{4}$  inches, or have a minus tolerance, as the original rope.

If you thought that a splice was simply tying a tight knot in the line, like a broken shoe-lace, listen to this: The splice consists of six "tucks" each eleven feet apart. Each tuck consists of a tail strand and a butt strand. When necessary the strands are "drawn out" either the butt or the tail ends. The broken or damaged wires are removed and new covering wires replaced. The inner or heart wires are also replaced when necessary. The tucked part of the strand is then wrapped with canvas and tucked into the center of the six strands where the original hemp core existed.

The cable itself is made of mild plow steel, right lang lay wires with a break pull of approximately 155,000 pounds. There are six strands composed of 16 wires each laid around a manila hemp heart.

All cars operating at one time on California Street, for instance, only exert a pull of about one-half that amount. There are 10 miles of single cable track and underground cable.

Normally, cables last anywhere from three to ten months, depending upon the line, number of cars, passenger volume — and even time of year! During the winter and wet weather months the tar, which coats and lubricates the cable, has a tendency to emulsify and slip off leaving the cable more vulnerable to damage.

Interestingly enough, the tar that is used for this purpose is pure pine tar from Louisiana of the same type used for medicinal purposes. The Railway purchases about 25 fifty-gallon barrels every year.

The cables cost from \$5,000 to \$11,000 each, depending upon the length, and are supplied by a local firm. During a day's operation they may travel more than four million feet.

A new cable, from the factory, is not joined like a rubber band but has to be reeled on to the cable winding machinery through the underground pits in the streets and back again through the carhouse entrance tunnels. It is hand-spliced with a 66-foot long section before being put into operation.



*Underground tunnel at Washington-Mason where cable enters and leaves the power house.*

| LINE                                                    | LENGTH      | AVERAGE<br>LIFE | COST     |
|---------------------------------------------------------|-------------|-----------------|----------|
| California<br>(Runs along<br>California Street)         | 21,500 feet | 300 days        | \$11,000 |
| Hyde<br>(To Beach-Hyde<br>turntable and<br>return)      | 15,700 feet | 125 days        | \$ 8,000 |
| Mason<br>(To Bay-Taylor<br>turntable and<br>return)     | 10,150 feet | 185 days        | \$ 6,000 |
| Powell<br>(To Powell-Market<br>turntable and<br>return) | 9,150 feet  | 110 days        | \$ 5,000 |

Before the cable is run under the street it is led on to a "tension carriage." This is a 14-foot, two-ton wheel mounted on a moveable track providing flexible, constant tension on the cable to automatically take up slack caused by cars on the line intermittently gripping and releasing the cable.

There is a second kind of slack which occurs, especially with a brand new cable. A new cable will stretch after it has been in use several weeks anywhere from 50 to 100 feet.

In addition to actually removing the unwanted slack by means of a splice — and this is usually necessary to perform about three times during the life of the cable — the tension wheel itself can actually be lifted off its main base and moved back on "take-up cleats" which provide increased tension on the cable and compensate for the stretch.

As the cable becomes longer the wheel is moved back and the tension remains the same.

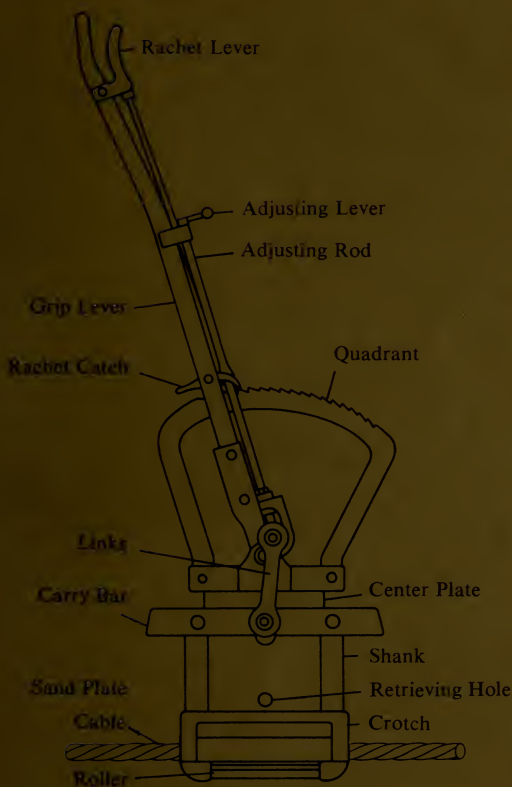
Also, when the cable is broken and needs to be replaced this wheel can be moved up and the line slacked off until the damage is repaired.

## ANATOMY OF THE GRIP

In principle, nothing is simpler than using a rope to pull a vehicle up a hill.

In practice, the cable car and its attendant machinery is a miracle of inventiveness and Yankee know-how.

The connection between the car and the cable is by an ingenious and most necessary device called the "grip."



The Grip

Fundamentally, the car moves when the gripman pulls back on the operating lever closing a pincer-like "grip" on the endless cable kept continuously in motion by electric motors in the carhouse.

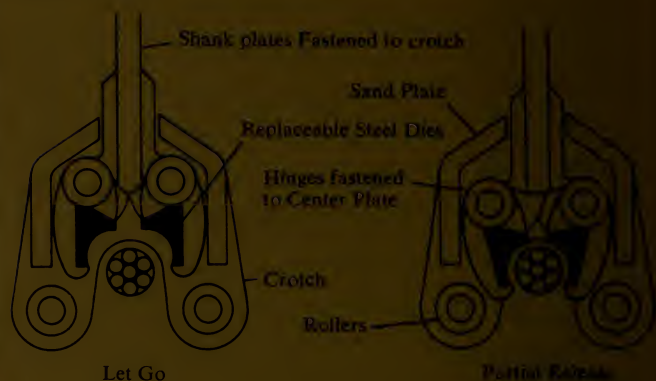
In the single-end cars the grip is located at the front end and on the forward truck of the car and extends down through the slot in the street to the cable which travels about 18 inches below street surface and is guided by pulleys and gears.



The grip itself is a semi-cylinder about a foot long and is in two parts that re-hinge and close over each side of the cable like a vise.

When the operator pulls back on the grip-lever, a heavy, metal plate descends against this cylinder forcing the two curved hinges, or grip "dies" to close around the cable. Two rollers, one on each side of the hinges, guide them over the cable.

As the grip-lever is pulled, pressure is put on the rope and the car is put into motion slowly, the tar on the cable acting as a lubricant to permit a smooth start and to reduce friction.





When starting to ascend a steep grade the gripman adjusts the grip for a firmer hold on the cable. The steeper the grade or heavier the load the tighter the grip must be.

Such adjustment can give the gripman the equivalent of a 125-pound pull which is transferred to the soft steel "dies" that grip the cable and result in a hefty 1,500-pound squeeze because of leverage.

Occasionally a grip breaks out on the line and you might be on hand to watch it being replaced.

A special wrecker-truck pushes the cable car to a "take out hatch" on the line where the cable can be completely released from the grip. The long, front window of the car is opened and, using block and tackle, the broken grip is taken out and the new one installed.

This is strictly a two man job since the grip weighs over 300 pounds and is eight feet long.

Most replacements, however, are made in the carhouse on a regular maintenance basis. The soft, metal dies lining the grip wear out after four or five days' use and about 6,000 new dies a year are used on the three cable lines.

Sometimes the early grips failed to function when the car was overloaded on a very steep grade. A San Francisco columnist has recalled the anecdote of a California Street cable car which was having trouble getting up the hill to Franklin Street when the line went out that far.

The car started up the grade from Van Ness and the conductor called out, "Franklin Street" just as the grip started to slip and the car slid with dignity down to the bottom of the hill.

The gripman tried again and as the car approached the intersection the conductor shouted "Franklin again" just as once more the car started sliding backwards down the hill.

This time some of the more understanding passengers got off the car and lent a helping hand from behind. As the car gamely made its way up the grade with help from the passengers the conductor triumphantly yelled, "For the third and last time — Franklin Street!"

## HOW DOES IT STOP?

Actually there are four separate braking devices on each car and both the gripman and the conductor share responsibilities for this phase of the cable car operation.



Cable Car, Municipal Railway Co.

### 1. *Wheel Brake*

The gripman depresses a foot lever that actuates a metal shoe which clamps down on the front wheels. In addition, the conductor turns a hand lever on the rear platform to operate the rear truck wheel brake when descending very steep grades.

### 2. *Cable Brake*

The cable itself, of course, is actually a form of brake for when it is held tight by the grip a descending car cannot go faster than the cable's steady nine miles per hour.

### 3. *Track Brake*

These are wooden blocks about two feet long, and two by three inches deep and wide, that fit between the two wheels on one or both "trucks," of front and rear chassis. The blocks or track shoes are in position over each rail and are operated by the gripman using a large hand lever on the front end of the car. When used, the blocks clamp down directly on the rail, almost lifting the car up slightly, and are quite effective.

These 2"x3½"x24" blocks, are cut from soft clear pine and last about four days during the summer months and two days during winter months when the wood soaks up moisture and wears more rapidly.

Over 5,000 hand-made wooden track shoes are turned out each year by the Railway's Carpentry Shop for the Cable Car Division.

### A. Emergency or Slot Brake

Apply named, this is only used as a last resort and is operated by either member of the crew on the double end (California line) cars, and by the gripman on the single end (Powell line) cars.

When the red-handled "hot-line" lever is pulled, it causes a guillotine-like, tapered piece of metal 18 inches long and one-inch thick to instantly penetrate the cable slot until it is wedged tight by pressure, friction and heat.

It not only stops the car "right now" but usually requires the services of a welding crew to burn off the brake blade in the slot.

Cable cars have been accused of not being 100% reliable about stopping in the same spot each time with the result that a car rumbling up or down the hill with a pedestrian in hot pursuit is not an uncommon San Francisco sight.

Most of the time they halt at the indicated corner, but, on occasion, they will glide right past and stop on the opposite corner if there is an intersection cable to cross or traffic is fencing them in.

This makes possible a clear-cut identification. A San Franciscan is a person who can reliably predict where the cable car is going to stop.

In deference to the city's sometimes unusual weather, it has also been said that a typical San Franciscan is one who rides around town in a convertible with the top down and the heater on.



Cable car, California St. Cable R. R. Co.

## PULLEYS—CARRIER, CROWN AND DEPRESSION BEAM

Pulleys are simply wheels with a grooved rim turning in a frame of metal and used to guide the cable through the channel underneath the street surface.

They vary in name and use.

Carrier pulleys support the cable from underneath. Crown pulleys are essentially the same except that they are a little larger in order to support the added strain at the crown or crest of the hill.

Carrier pulleys are located along the line about every 300 feet and access to them is through a pulley hatch cover approximately 12 inches square adjacent to the slot.

Pulleys which ride on top of the cable and hold it down (for instance at the bottom of hills) are called depression beam pulleys. If it were not for the depression beam pulleys the cable would obviously tend to jump out of the slot and assume a position high in the air.

How does the grip pass such an arrangement without interference? The answer is found in the illustration below.

The pulleys are fixed to a depression bar which is on a pivot and is able to move in a sideways direction. As the grip approaches the bar the cable is pressed down. This action frees the two pulleys and they are pushed aside together with the bar itself as the grip passes.



1. Approaching grip holds cable below depression bar



2. As grip passes, the bar is pushed to one side

Finally, part three of the diagram shows the grip after it has passed the bar which then swings back to its original position over the cable.

The second type of pulley that holds the cable down is known as a stationary depression pulley. It does not have to move aside for the grip as the gripman has already completely released the cable before traveling over the stationary depression pulley.



12. When grip has passed, bar moves back into position over cable.



There are certain places along all cable car routes at which the gripman must let go of the cable — at cable intersections — at “let-go” curves — and where the car is about to switch from one cable to another.

This “let-go” procedure is obviously one of the most important duties a gripman has to master.

To aid him, an ingenious “bumper bar and bell” arrangement was devised to warn him of an approaching let-go location.

The illustration below shows how the bumper bar and bell works. This safety device is located immediately preceding each of the 13 let-go points located throughout the three cable lines.





## THE CABLE CAR "SANTACADE" AT CHRISTMASTIME

San Franciscans, who respond to tradition and excitement in equal measure, consistently turn out 10,000 strong to attend the annual "Santacade" which officially opens the holiday season. Santa Claus, perched on his throne high atop a gaily decorated cable car, descends from the lofty heights of Nob Hill, past Union Square, to be met by thousands of children crowded around the Powell-Market Street turntable.

The hour-long parade, usually held the second week in November, has included such participants as the Junior 49'er Drum and Majorette Corps; children in holiday costume from the San Francisco Recreation and Park Commission playgrounds, ice queens and ice skaters and always some unusual attraction.

One year it was a baby elephant all dolled up in red pantaloons and boots; another year, an old-time monkey grinder. There have also been dog sleds drawn by teams of Alaskan huskies; an unbelievably loud steam calliope, prancing stallions from the Cow Palace exposition, the famous Guckenheimer German Band, and Budweiser's world-renowned beer truck drawn by a matched team of imposing Percherons.



## CABLE CAR CAROLERS— A UNIQUE SAN FRANCISCO TRADITION

Along with the Ferry Building, Fisherman's Wharf, fresh crab and French bread, another delightful and uniquely San Francisco tradition that has gained in popularity during the past several years is Christmas caroling aboard the cable cars.

Anywhere from one to two dozen singing groups make arrangements with the Municipal Railway several weeks before December 25th to board one of the cable lines and complete a round trip spreading Christmas cheer and good songs along the way.

In keeping with the spirit of the air-conditioned hill climbers, and the brisk winter evenings, standard costume seems to be overcoats, mufflers, mittens and thermoses of hot coffee or other spirit-warming holiday beverages.

The caroling groups may be composed of a dozen or so hardy souls who almost spontaneously get together at a business office downtown or may involve several hundred members of a large church choir who, of course, use three or four cars for their performance.

Christmas shoppers and residents along the routes agree that this happy custom is typically San Franciscan and a most pleasant introduction to the holiday season.

## CABLE CARS AND THE NEW WOMAN

On Tuesday, February 2, 1965, another cherished San Francisco tradition bit the dust when a Miss Mona Hutchinson, a student at the University of California, boarded Car No. 521 on the Powell-Hyde line, decided she wanted to savor the brisk breezes of the early autumn afternoon and proceeded to take up a standing position on the outside running board of the cable car, since time immemorial strictly a male preserve.

This awkward decision promptly tied up the entire line, including 24 cable cars, for the better part of the afternoon.

Although the practice of lady riders standing on the outside lower step has long been frowned upon by Muni management, because of the theoretical danger of billowing skirts and delicate high heels, the resolute Miss Hutchinson, nevertheless, stood her ground despite entreaties from the gripman, the conductor, several bewildered Municipal Railway Inspectors and finally an officer from the San Francisco Police Department.

It has come to pass that although Municipal Railway management still takes a dim view of ladies riding on the outside running board, the gripman, after a polite suggestion that the ladies might be more comfortable sitting on the seat, sighs resignedly and harkens back to the good old days when only males were allowed to brave the elements and to manfully tighten their grip on the stanchions when zipping "round the curve."

During "L'affaire de la dame et le cable car," which was light-heartedly given Page 1 prominence by the city's newspapers, radio and TV stations, another young lady was moved to write the Railway:

"— am writing you in strong protest against this form of segregation. Safety — phooey and you know it! Having spent my girlhood on a farm riding on the running boards of farm trucks I can testify that it is fun, invigorating and not even immoral to ride in such a manner. Only a dead-drunk would be likely to injure himself. We women enjoy the invigorating breezes as fully as our male counterparts!"

## WHERE THEY GO

There is no better way of sampling San Francisco's sweeping vistas than by cable car.

There are three separate cable car lines, all owned and operated by the city's municipal transit system, the San Francisco Municipal Railway, under the jurisdiction of the San Francisco Public Utilities Commission.

The No. 59-Powell-Mason line leads from the busy corner of Powell and Market Street, in the center of the shopping district, up over fabled Nob Hill and down again into the colorful sights and smells of Fisherman's Wharf.

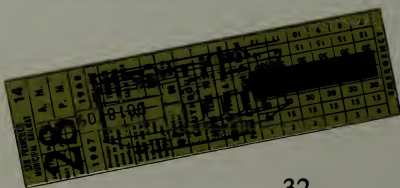
The No. 60-Powell-Hyde line, the most spectacular from the standpoint of vertical and lateral zig-zags, runs from the same downtown intersection up over Nob and Russian Hills to its picturesque turntable in the gaslit Victorian Square at Aquatic Park.

San Francisco's Maritime Museum, a newly assembled flotilla of historic exhibition ships, and the Ghirardelli Square shopping-restaurant complex, are less than a block away.

The No. 61-California route stretches from the foot of California Street, at Drumm and Market Streets in the financial district, cuts across colorful Chinatown at Grant Avenue, breasts Nob Hill and two of the city's largest hotels and terminates at Van Ness Avenue, or as it is sometimes called, Automobile Row.

The Powell Street system, using green and cream cars, was acquired with the purchase of the Market Street Railway in 1944. The California Street Company, with red and gray cars, was taken over by the City in 1952.

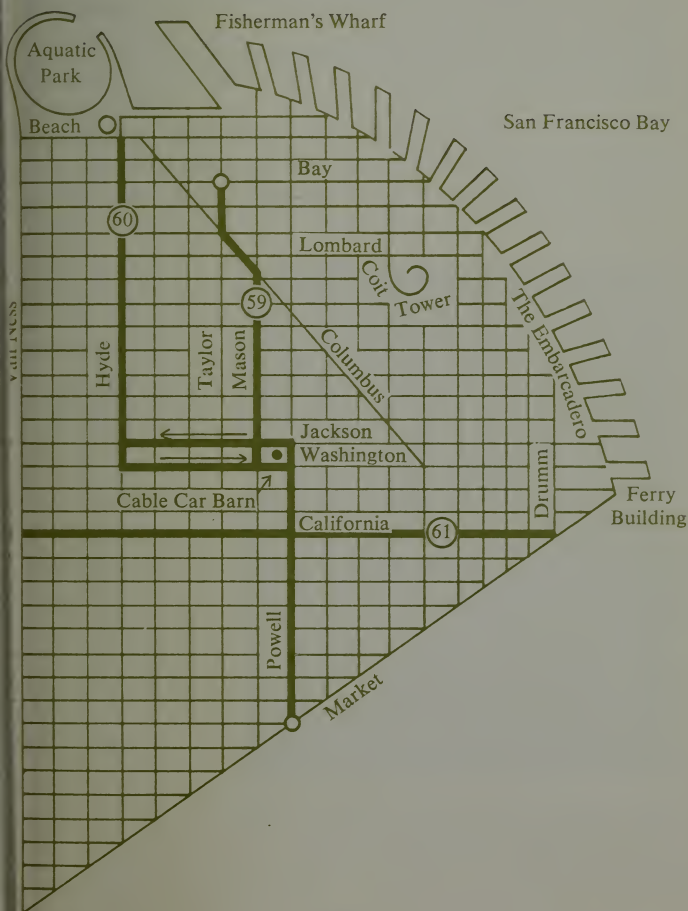
The fare on all lines is 15¢ with free transfer privileges. In fact, the fare to everywhere in San Francisco via Muni's 700-mile network of cable car, streetcar and bus routes is 15¢ making this one of the real transit bargains in the nation.



Like to explore? Have your own Sunday safari? An even better bargain than is the Muni's 50¢ "Sunday-Holiday Pass" good all day for unlimited rides on Sundays and holidays and sold by starters at the Powell-Market turntable and all cable car conductors, as well as at other convenient locations. Call the Muni's Information Bureau, 558-4111, for details.

Patrons who live near the cable car lines proudly say they get the best 15¢ worth of entertainment in San Francisco when they take a ride on a cable car. And every year thousands of people come thousands of miles to ride the cars — ten miles of roller coaster thrills, scenic splendor and chiming bells.

Be sure to ride all three lines, they are a living symbol of San Francisco's romantic and colorful past.





## CABLE CAR OPERATION SHUTDOWN FOR A \$275,000 OVERHAUL

The first major change since 1887 involving power house equipment to take place at the historic old barn at Washington and Mason Streets occurred during the Spring of 1965.

Large signs at the terminals of the three cable lines proclaimed "The cars with the smile will be gone for awhile."

And indeed they were. The entire cable operation was shut down for three weeks to allow for needed repair and refurbishment of gear-trains, winder-sheaves, shafts, bearings and cable-winding machinery at the power house. Substitute bus service was provided during the 21-day period although passenger volume fell to nearly half its 27,000 count daily average!

The entire project cost a little over \$275,000 and the firm supplying the major items of equipment was VOEST in Linz, Austria, represented locally by International Aerial Tramways, Inc.

Many of the "new" replacement parts were very similar to the worn gears, wheels and other equipment being taken out even though the original components were constructed and installed over 50 years ago!



*If you're tired of your present humdrum job you might apply as an Oiler whose task it is to make daily underground inspections, lubricating sheaves and pulleys, in the block-long cable tunnel*

## THE MAN BEHIND THE GRIP

It takes two men, the gripman and the conductor, to operate a car. Since cable car men get the same pay as bus drivers or streetcar motormen for harder, colder work it is often more difficult to fill the occasional vacancy that occurs in the total Cable Car Division complement of 125 platform employees.

Gripmen, who need strength and heft to operate the long grip lever, tend to be large, rugged types. Conductors, who must use a certain amount of agility and squeeze in among tightly packed passengers to collect fares, are more on the thin, wiry side.

Whether it is due to tradition or the general attraction of the man to the job, most cable car personnel seem to assume the character associated with the job since early historical days.

Cable car conductors and gripmen, probably because there are so few of them, constitute something of an elite corps among public transit operators. Some of the senior cable car men who have been on the job for 20 or 30 years have become local institutions in their own right demonstrating a full-blown flair for showmanship, finesse and a special brand of repartee for the out of town trade.

Their patter, varying from pure corn to helpful guidebook information to sarcastic comments on the state of the nation, weather, or the innocent ignorance of the tourist, is as familiar as the clanging of the gripman's bell, the steep hills and the lulling clatter of the cables whirring under the streets of the City.

## CABLE CAR POTPOURRI

The little cable cars weigh about six tons each, empty, with a seating capacity ranging from 30 on the Powell line cars to 34 on the California cars. Of course, during busy hours they sometimes carry two or three times that number of passengers and the gripman, surrounded by passengers, can barely be seen.

Total number of passengers carried per day on the three lines is about 25,000.

San Francisco has two different types of cable cars, as you perhaps have noticed: the "single-end cars," operating on Powell Street and the "double-end cars" which run along California Street.

With only one grip mechanism on the single-end cars, their direction has to be reversed by means of a turn-table at each end of the line. Double-enders, with two sets of grips, can go in either direction with the greatest of ease and their terminal merely consists of a cross-over track to enable the car to transfer to the cable moving in the opposite direction.

Even knowledgeable cable car aficionados are often tricked by the question, "How many turntables are there?"

They usually name Powell-Market, Bay-Taylor and Beach-Hyde but overlook the one hidden away in the outside service yard of the Washington-Mason carhouse. Just like the other turn-tables, however, it is in daily use and, by eliminating trackage and rail-switches, serves the same purpose as a revolving table in a railroad switch yard.

Of the 39 cars now in use, between 23 and 31 operate on any given day over the three cable lines on grades in excess of 21%.

Twenty-seven of the hill climbers date back before the mid 1890's, some as early as 1886. These are the single grip green cars that reverse direction on manually operated turntables at the ends of the Powell Street lines at Market Street, Aquatic Park and Fisherman's Wharf.

The other 12, the red, double-end California Street cars, had to be completely re-duplicated after the fire and earthquake of 1906.

With the exception of such minor improvements as a slight change in grip design in 1956, and installation of electric windshield wipers in 1964, the cars are essentially the same now as they were in the late 1870's. Like a worn and favorite sweater, however, they've been patched, painted and added to so often that possibly little of the pristine original of the car remains today.



## RX FOR TIRED CABLE CARS

As the companies manufacturing these cars, or at least the parts, have long given up their horse carriage, buggy whip and cable car business, any repairs or alterations that are made are necessarily performed in the Municipal Railway's own shops either at the Cable Car Barn or at the Elkton Shops located at Ocean and San Jose Avenues.

No longer are we able to write the Hammond Company, Mahoney Brothers, California Cable Company and the Carter Brothers for news of their latest designs and models in cable cars!

It takes about 150 man-work-days and \$5,000 or \$6,000 to even partially rebuild and spruce up one of the cars which, of course, had already reached old age at the turn of the century. All machine parts have to be cast and forged by hand. The wooden fixtures are carefully produced by individual craftsmen and over a half-dozen trades may be represented in the re-construction of a car including machinists, carpenters, blacksmiths, painters, electricians, glaziers and battery repairmen.

It has been estimated that it would cost almost \$30,000 to completely build, mostly by hand, a brand new cable car from the wheels up — about the price of a new, modern, deluxe 44-passenger diesel coach!



## END OF THE LINE

Throughout the world, mayors and park superintendents, business firms and rail fans proclaim their eagerness to purchase San Francisco's "junked" dinkies at high prices.

In Osaka, Japan, San Francisco's sister city, one of the elderly vehicles is proudly displayed in a public park. It cost the Japanese over \$10,000 just to erect a handsome shelter for this gift from the people of San Francisco which is on permanent loan to the City of Osaka.

Down at Knott's Berry Farm in southern California, one of the surplus cars carries happy tourists through the grounds and orange groves. In Chicago, Harold Warp, a dedicated cable car buff, paid \$500 for his own Nob Hill relic, plus many hundreds more for shipping, and proudly displays it in a private museum.

One old San Francisco cable car is housed in a fire station in Tacoma, Washington. Others are being used as snack bars, swimming pool dressing rooms, duck blinds, gazebos and greenhouses. Not too long ago you could acquire, through the City Purchaser's Office, a scrapped car for as little as \$50. Today the going price for an antiquated dinkey of Gay 90's vintage is \$5,000 and up, plus hefty shipping expenses.

Even at this healthy tab there are no cars available now or in the foreseeable future.

The Municipal Railway needs every car it can get, has a regular car re-building program, and has plans to construct new ones when funds become available.

## SYMBOL OF AMERICA'S MOST EXCITING CITY

San Francisco's beloved dinkies have had their ups and downs, figuratively as well as literally.

There have been, in the past, repeated moves to abolish the cable cars and to replace them with modern and more economical motor coaches; each campaign, however, fortunately frustrated by an indignant populace. The most recent clash with the engineers and efficiency experts came in 1947 when a resolute and city-wide Citizens' Committee was mobilized to "Save the Cable Cars" and did.

The toy trams' future is now secure.

A proviso guaranteeing maintenance and perpetuation of the three existing cable car lines was written into the City Charter in 1955. This mandate can be neither revoked nor amended without the approval of a majority of San Francisco's voters. And this majority seems to be solidly behind the antique hill-climbers and hang the fact that they're really not the most practical form of transportation or that they're a little costly to operate.

They are also fun.

This then is the story of the cable car — symbol and hallmark of America's most individualistic city. The life of San Francisco in the "cable car age" of the late 1800's was the most urbane, the gayest and the most opulent in the record of the Western continent.

It is through the present day operation of the cable cars that we are able to remember and preserve that wonderful age that is gone forever except in fond memory.

## FACT SHEET

### PAINT COLORS

#### California Cable Cars

Main body, sides, front and roof . . . . Dupont Maroon  
Pilot boards, steps, side rails . . . . . Suede Grey  
Seats and sash (window frames) . . . . . Dupont Sand  
Ceiling and interior, closed section . . . . Dupont Ivory

#### Powell Cable Cars

Closed section . . . . . Milori Green  
Pilot boards, steps, side rails and roof . . . . Suede Grey  
Seats, sash and interior, closed section . . . Dupont Sand  
Front, rear ends and ceiling . . . . . Dupont Ivory

### SPECIFICATIONS

| <i>Single End Cars</i>   |                               | <i>Double End Cars</i>   |
|--------------------------|-------------------------------|--------------------------|
|                          | Weight                        |                          |
| 12,180 pounds            |                               | 11,500 pounds            |
|                          | Seating Capacity              |                          |
| 30                       |                               | 34                       |
|                          | Length over<br>Bumpers        |                          |
| 27 feet                  |                               | 30 feet 5 inches         |
|                          | Length over<br>Closed Section |                          |
| 12 feet                  |                               | 10 feet 7 inches         |
|                          | Length over<br>Open Section   |                          |
| 15 feet                  |                               | 9 feet                   |
|                          | Width over<br>Steps           |                          |
| 7 feet 10 inches         |                               | 8 feet                   |
|                          | Truck Centers                 |                          |
| 11 feet 8 inches         |                               | 19 feet                  |
|                          | Height                        |                          |
| 10 feet 3 inches         |                               | 10 feet 3 inches         |
|                          | Size and Type<br>of Wheel     |                          |
| 22 inches,<br>cast steel |                               | 22 inches,<br>cast steel |
|                          | Track Gauge                   |                          |
| 3 feet 6 inches          |                               | 3 feet 6 inches          |

## HOURS OF OPERATION

### *Lines 59-POWELL-MASON and 60-POWELL-HYDE*

Weekdays and Saturdays

6:00 a.m. to 1:00 a.m. with a 5 to 9 minute headway

Sundays and Holidays

6:30 a.m. to 1:00 a.m. with a 10 minute headway

### *Line 61-CALIFORNIA*

Weekdays

6:00 a.m. to 11:00 p.m. with a 5 to 15 minute headway

Saturdays, Sundays and Holidays

7:15 a.m. to 11:00 p.m. with a 15 minute headway

## FARE

15¢, free transfers issued

## STEEPEST GRADES

### *59 POWELL-MASON line*

On Powell between Bush and Pine . . . . . 17.5%

### *60 POWELL-HYDE line*

On Hyde between Bay and Francisco . . . . . 21.3%

### *61 CALIFORNIA*

On California between Grant and Stockton . . . . 18.2%

## CABLE SPEED

840 feet per minute or 9 mph

## AVERAGE ANNUAL OPERATING STATEMENT

|                          |             |
|--------------------------|-------------|
| Revenue . . . . .        | \$1,355,000 |
| Expense . . . . .        | \$2,275,000 |
| Loss . . . . .           | —\$ 920,000 |
| Passengers . . . . .     | 10,000,000  |
| Miles operated . . . . . | 455,000     |
| Hours operated . . . . . | 98,000      |



# THE CABLE CARS OF SAN FRANCISCO

Published by the San Francisco Public Utilities  
Commission, which has responsibility for the  
Cable Car Division of the Municipal Railway.

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MASON

MUNICIPAL RAIL





